

U.S. Patent Application Serial No. 10/527,699

Amendment filed January 26, 2009

Reply to OA dated January 22, 2009

**AMENDMENTS TO THE CLAIMS:**

Please cancel claim 2 without prejudice or disclaimer, and amend claims 1, 3 and 17, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently amended): A catalyst composition comprising a crosslinked organic polymer compound and a ~~palladium catalyst~~ Pd(0), wherein said catalyst is physically carried on said crosslinked organic polymer compound, prepared by

homogenizing a straight chain organic polymer compound having a crosslinkable functional group, and ~~[[the]]~~ a palladium catalyst in a solvent dissolving said straight chain organic polymer compound;

then depositing the composition formed; and

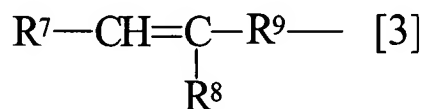
subjecting a crosslinkable functional group in said deposited composition to a crosslinking reaction,

and wherein said straight chain organic polymer compound is obtained by polymerizing  
1) ~~[[the]]~~ a monomer having a crosslinkable functional group and a polymerizable double bond represented by :

(1) a glycidyl compound having an epoxy group as a crosslinkable functional group, selected from the group consisting of a glycidyl ether and a glycidyl ester represented by the following general formulas [1] and [2], respectively,



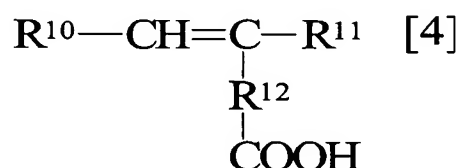
wherein R<sup>2</sup>, R<sup>3</sup>, R<sup>5</sup> and R<sup>6</sup> each independently represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; X and Z each independently represents an alkylene group having 1 to 6 carbon atoms; R<sup>2</sup> may form a ring of 3 to 6 members together with carbon atoms of R<sup>3</sup> or X, and R<sup>5</sup> may form a ring of 3 to 6 members together with carbon atoms of R<sup>6</sup> or Z; and R<sup>1</sup> and R<sup>4</sup> each independently is a group represented by the following general formula [3]:



wherein R<sup>7</sup> and R<sup>8</sup> each independently represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R<sup>9</sup> represents a direct-linkage, an alkylene group having 1 to 6 carbon atoms, an arylene group having 6 to 9 carbon atoms, an arylalkylene group having 7 to 12 carbon atoms or an arylenealkylene group having 7 to 15 carbon atoms, wherein the aromatic ring in the arylene or

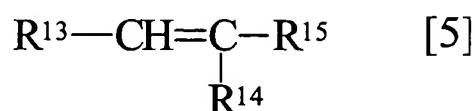
arylenealkylene group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom, as a substituent;

(2) a monomer having a carboxyl group as a crosslinkable functional group, represented by the following general formula [4]:



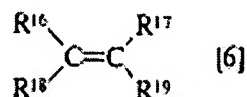
wherein  $\text{R}^{10}$  represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms;  $\text{R}^{11}$  represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms or an aralkyl group having 7 to 12 carbon atoms, wherein the aromatic ring in the aryl group or aralkyl group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom as a substituent; and  $\text{R}^{12}$  represents a direct-linkage, an alkylene group having 1 to 6 carbon atoms, an arylene group having 6 to 9 carbon atoms, an arylalkylene group having 7 to 12 carbon atoms or an arylenealkylene group having 7 to 15 carbon atoms; or

(3) a monomer having a hydroxyl group as a crosslinkable functional group, represented by the following general formula [5]:



wherein R<sup>13</sup> represents a hydrogen atom or an alkyl group having 1 to 20 carbon atoms; R<sup>14</sup> represents a hydroxyl group that may have a carbonyl group and/or an oxygen atom; R<sup>15</sup> represents a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms or an aralkyl group having 7 to 12 carbon atoms; and an aromatic ring in the above aryl group or aralkyl group may have an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms and/or a halogen atom, as a substituent, and optionally

2) [[the]] a monomer having a polymerizable double bond is represented by the general formula [6]:



wherein R<sup>16</sup> and R<sup>17</sup> each independently represent a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R<sup>19</sup> represents a hydrogen atom, a halogen atom or an alkyl group having 1 to 6 carbon atoms; R<sup>18</sup> represents a carboxyl group, a hydroxyl group, an acyloxy group having 2 to 6 carbon atoms, an arylacyloxy group having 7 to 15 carbon atoms, an alkoxycarbonyl group having 2 to 6 carbon atoms, an alkyl group having 1 to 6 carbon atoms, an aryl group having 6 to 10 carbon atoms and an aralkyl group having 7 to 12 carbon atoms; an aromatic ring in the above arylacyloxy group, aryl group and aralkyl group, may have further an alkyl group having 1 to 4 carbon atoms, an alkoxy group having 1 to 4 carbon atoms or a halogen atom, as a substituent.

Claim 2 (Currently amended): The composition according to claim 1, wherein the palladium catalyst is derived from Pd(0) ~~or a salt of Pd(II)~~.

Claim 3 (Currently amended): The composition according to Claim [[2]] 1, wherein Pd(0) has no ligand.

Claim 4 (Previously presented): The composition according to Claim 1, wherein the crosslinked organic polymer compound is:

a crosslinked product of a polymer or a copolymer obtained by polymerizing or copolymerizing 1) at least one monomer selected from (1) said glycidyl compound having an epoxy group, (2) said monomer having a carboxyl group, and (3) said monomer having a hydroxyl group or

a crosslinked product of a copolymer obtained by copolymerizing 1) at least one monomer having a crosslinkable functional group and a polymerizable double bond selected from (1) said glycidyl compound having an epoxy group, (2) said monomer having a carboxyl group, and (3) said monomer having a hydroxyl group, and 2) at least one monomer having a polymerizable double bond which is represented by the general formula [6].

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Claim 5 (Previously presented): The composition according to Claim 4, wherein the crosslinked organic polymer compound is a crosslinked product of a copolymer obtained by copolymerizing :

- 1) two monomers having a crosslinkable functional group and a polymerizable double bond
- and
- 2) one monomer having a polymerizable double bond.

Claim 6 (Previously presented): The composition according to Claim 4, wherein the crosslinkable functional group is an epoxy group, a carboxyl group, a hydroxyl group or an acyloxyl group.

Claim 7 (Previously presented): The composition according to Claim 4, wherein ratio of a monomer unit derived from a monomer having a crosslinkable functional group and a polymerizable double bond is 0.1 to 100% based on all monomer units in the whole copolymer before crosslinking of the crosslinked organic polymer compound.

Claim 8 (Canceled).

Claim 9 (Previously presented): The composition according to Claim 4, wherein :

one monomer having a crosslinkable functional group and a polymerizable double bond is a glycidyl ether represented by the general formula [1]; and

the other monomer having a crosslinkable functional group is a monomer represented by the general formula [4] containing a carboxyl group, as a crosslinkable functional group, or a monomer represented by the general formula [5] containing a hydroxyl group as a crosslinkable functional group.

Claim 10 (Previously presented): The composition according to Claim 4, wherein at least one of the monomers having a crosslinkable functional group and a polymerizable double bond represented by the general formulas [1], [2], [4] and [5], and monomers having a polymerizable double bond represented by the general formula [6], has an aromatic ring.

Claim 11 (Previously presented): The composition according to Claim 4, wherein all of monomers having a crosslinkable functional group and a polymerizable double bond represented by the general formulas [1], [2], [4] and [5], and of monomers having a polymerizable double bond represented by the general formula [6], have an aromatic ring.

Claim 12 (Previously presented): The composition according to Claim 4, wherein in a monomer containing a hydroxyl group as a crosslinkable functional group, represented by the general formula [5],  $R^{14}$  is a straight chain hydroxyalkyl group having 1 to 50 carbon numbers, which may contain an oxygen atom.

Claim 13 (Previously presented): The composition according to Claim 4, wherein in the crosslinked organic polymer compound has a crosslinked portion between an alkylene chain derived from a polymerizable double bond, and another alkylene chain derived from a polymerizable double bond, and

the number of atoms in the shortest chain of said crosslinked portion is 1 to 400.

Claim 14 (Previously presented): The composition according to Claim 1, wherein the crosslinked organic polymer compound is that obtained by crosslinking a copolymer of:

- (I) a glycidyl compound having an epoxy group and a polymerizable double bond;
- (II) a styrene type monomer; and
- (III) an acrylic acid type monomer or a monomer containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond.



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Claim 15 (Previously presented): The composition according to Claim 14, wherein the monomer of (III) in the crosslinked organic polymer compound has a hydroxyalkyl group containing at least one oxygen atom and a polymerizable double bond.

Claim 16 (Original): The composition according to Claim 14, wherein :

- the glycidyl compound having an epoxy group and a polymerizable double bond is vinylbenzyl glycidyl ether or vinyl phenylglycidyl ether;
- the styrene type monomer is styrene or methylstyrene;
- the acrylic acid type monomer is an acrylic acid or a methacrylic acid; and
- the monomer containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond is tetraethylene glycol monomethacryloyl ester or tetraethylene glycol mono-2-phenyl-2-propenyl ether.

Claim 17 (Currently amended): A method for producing the composition according to Claim 1, comprising the steps of:

- homogenizing a straight chain organic polymer compound having a crosslinkable functional group, and a palladium catalyst derived from Pd(0) in a solvent which dissolves said straight chain organic polymer compound;

- depositing the composition produced; and

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subjecting a crosslinkable functional group in said deposited composition to a crosslinking reaction.

Claim 18 (Original): The method for production according to Claim 17, wherein the palladium catalyst is a complex with triphenylphosphine, tri-*t*-butylphosphine, triethylphosphine, or trimethylphosphine.

Claim 19 (Previously presented): A method for performing a substitution reaction at an allyl position, comprising the steps of:

reacting an allyl carbonate with a nucleophilic agent in the presence of the composition according to Claim 1 to form a compound where the carbon nucleophilic agent is substituted at carboxyl ester position of the allyl carbonate.

Claim 20 (Previously presented): A method for performing an oxidization reaction of an alcohol, comprising the steps of:

reacting the composition according to Claim 1 with an alcohol to form a ketone compound corresponding to the alcohol.